Glimpse

3D Web Platform

Developed by: Josh Poole & Cam Skubik-Peplaski
Sponsored by: Kinetic Vision

Team

Team Members:

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  - Computer Sciences
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Advisor:

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Abstract

Glimpse is a content management & storage platform for the visualization of 3D CAD models, simulation results, and VR/AR assets. In leveraging modern web technologies like Azure Cloud, ReactJS, Python Flask, and Docker, the platform will be a flexible and scalable application that enables content-sharing, rapid prototyping, design feedback, and more across an organization.

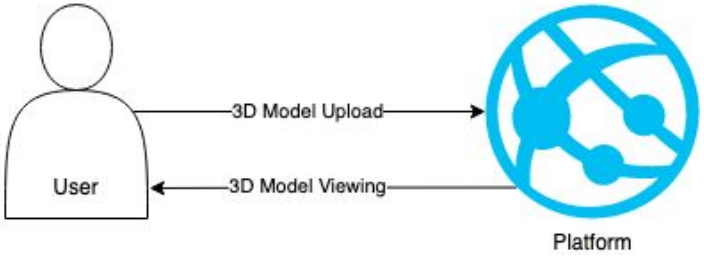
User Stories

- As a **mechanical engineer**, I want to be able to upload, download, and view 3D content in my, or my team's, project so I can work efficiently with all my files in one place.
- As a **project manager**, I want to manage the content uploaded to a project, so that I can help designers and engineers collaborate more effectively.
- As an **organization owner**, I want to be able to manage all of the projects associated with my organization so I can make sure all of my employees are using the service appropriately.
- As a **graphic designer**, I want to be able to easily share files as view-only, so that I can show clients my work without worry.

Design Diagrams

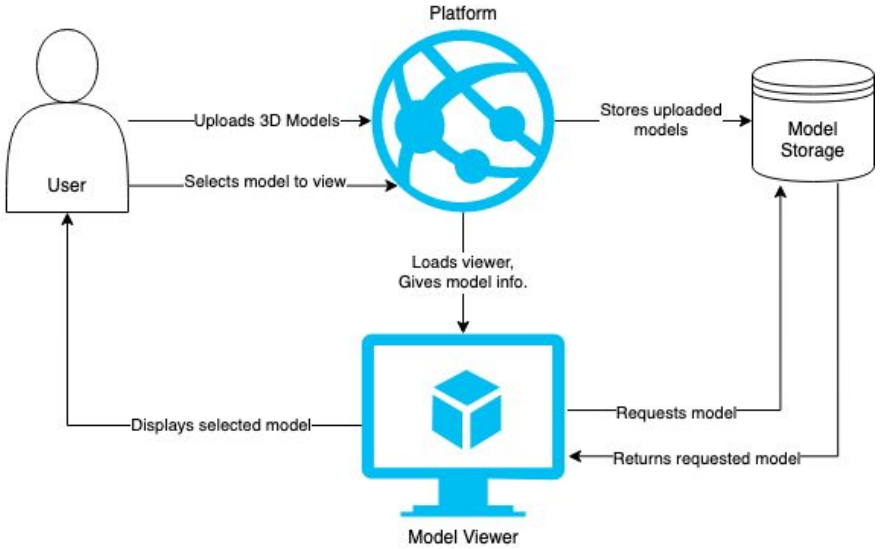
3D Web Platform: D0 Diagram

A platform to upload, visualize, and share 3D content on the web or via AR.

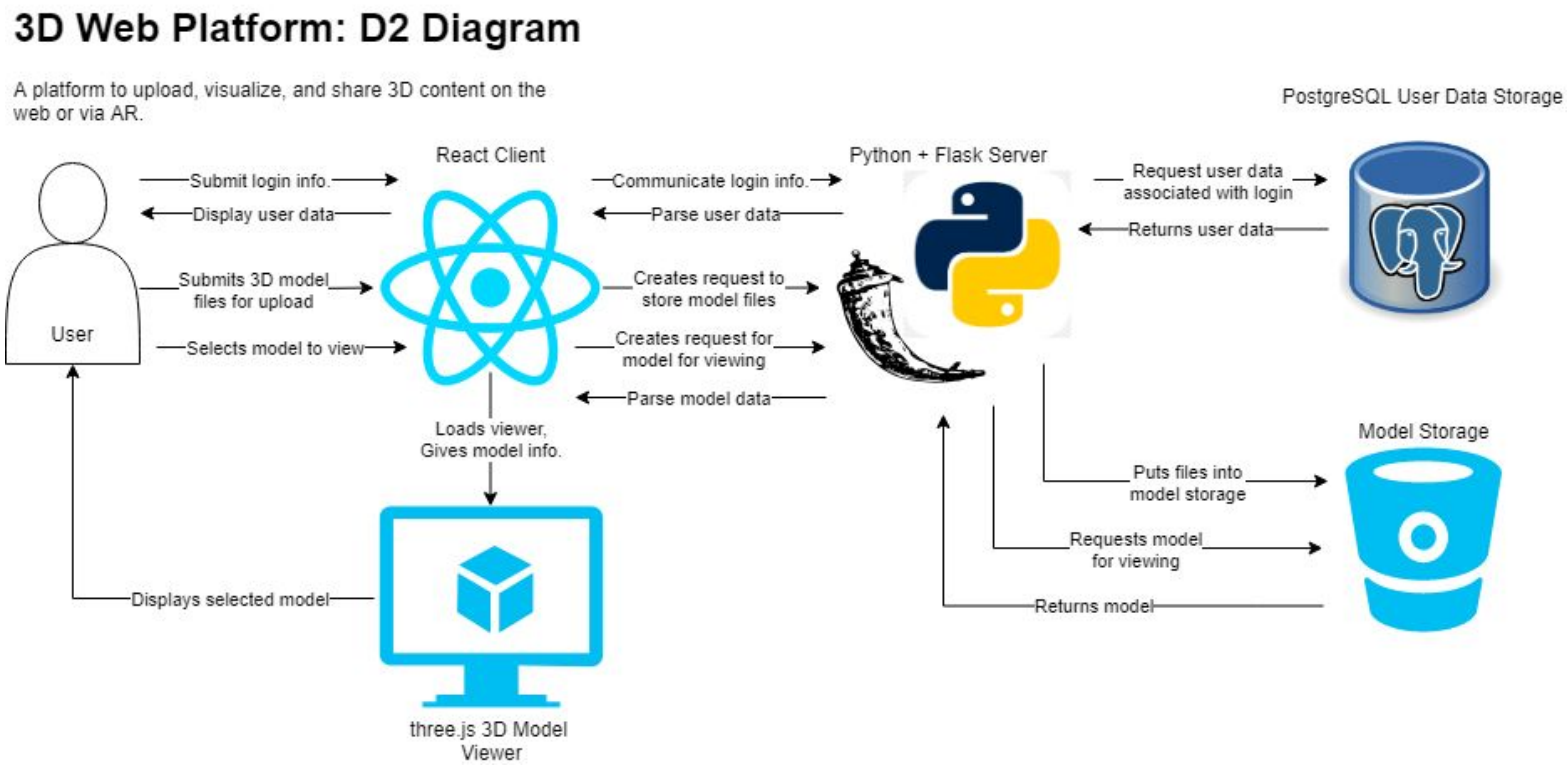


3D Web Platform: D1 Diagram

A platform to upload, visualize, and share 3D content on the web or via AR.



Design Diagrams, cont.



Major Constraints

Third Party

- Azure Services from Microsoft
  - *Impact:* We are reliant on Azure's services and their uptime consistency.
  - *Solution:* We should make sure the project can stand on another service if necessary.

- The libraries we plan to use, especially React and three.js
  - *Impact:* We are reliant on features that exist in the version we use when starting, if features change, it can break the application.
  - *Solution:* We need to make sure we lock down what version we use, and update the libraries and packages only when ready to work with the changes.
  - *Impact:* Some package options may not be very popular, so community resources on them would be sparse.
  - *Solution:* We should choose commonly known/used packages and libraries.

Time

- Project is set to be completed within the year-long period.
  - *Impact:* Hard due date for delivery, which limits the project to what can be done in that time frame.
  - *Solution:* We should ensure task date estimates are done with the hard delivery date in mind.

- Work on the project must be juggled with other schoolwork.
  - *Impact:* Limits team members' time to work on the project.
  - *Solution:* We should keep the project simple where possible, so that the project's workload does not heavily conflict with others.

Major Constraints, cont.

Complexity

- The project can be complicated by issues like scope creep, poor-quality code in heavily relied-upon components, or trying to implement too much at the same time.
  - *Impact:* Complications will slow down development and push back delivery dates as we try to fix or work around it.
  - *Solution:* We need to minimize/disallow scope creep, focus on key features, follow good practices, keep focused on one task at a time, etc.

Team Size

- There are only two team members, who have workloads outside of this project.
  - *Impact:* Limited dev-power for the majority, if not all, of the project's timespan. Limits number of features that can be implemented: only 2 things can be worked on at once, etc.
  - *Solution:* We have to make sure that project completion stays feasible for a team of 2. This can mean limiting the planned feature set, simplifying existing features, etc.

Progress Review

- Defined all tasks to be completed, assigned them, and created an interactive workflow board to implement agile methodologies into the process
- Completed research and investigation stage into libraries and resources we plan to use
- Decided on official product name for the project
- Defined each required page and their purposes
- Defined database structure with an entity-relationship diagram in 3rd normal form
- Created official project code repository

Expectations for this Semester

- Get started on the development phase
- Complete system architecture and workflow diagrams
- Implement cloud infastructure
- Implement 3D viewer
- Implement back-end SQLAlchemy models
- Implement back-end functions

Division of Effort

Task		Primary	Division of Effort	
			Cam	Josh
Milestone: Investigation				
Investigate Three.js or wrapper libraries that implement it for use in 3D Viewer		Cam	100.00%	0.00%
Investigate the planned web stack, including React, Flask, Ant Design, and the Kinetic Vision Web Boilerplate		Josh	0.00%	100.00%
Investigate Azure services for possible platform, database, and 3D model storage options		Cam	100.00%	0.00%
Milestone: Design & Document				
Design a database for the platform, using 3rd normal form (3NF)		Josh	10.00%	90.00%
Define the individual pages required for the platform and their purposes		Cam	70.00%	30.00%
Document the platform's workflow, system architecture, and database diagrams		Josh	30.00%	70.00%
Design mockups for the defined pages using Figma		Cam	100.00%	0.00%
Milestone: Setup				
Create a repository for the project's code		Josh	0.00%	100.00%
Implement the could infrastructure necessary for the platform		Cam	100.00%	0.00%
Milestone: Development				
Back-End	Implement the SQLAlchemy database models within server, based on the design created earlier	Josh	20.00%	80.00%
	Implement the back-end server API	Josh	20.00%	80.00%
	Implement the back-end server functions	Josh	10.00%	90.00%
	Implement the back-end server workflow	Josh	0.00%	100.00%
Front-End	Implement the 3D viewer	Cam	100.00%	0.00%
	Implement the front-end client web pages	Cam	100.00%	0.00%
Milestone: Testing				
Test that the 3D Viewer works with all common 3D model file format		Cam	100.00%	0.00%
Milestone: Deployment				
Research and create a CI/CD pipeline for the platform		Josh	0.00%	100.00%
Create a QA/Develop environment using the cloud infratructure previously created		Cam	100.00%	0.00%

Expectations for the Expo

- Our demo will show how Glimpse will be used by its future customers.
- We will show the home page, where public 3D models are displayed, and can be interacted with through likes and comments.
- We will demonstrate how a user can upload or download a 3D model file.
- Lastly, we will show how a user can interact with the model through the model viewer; specifically, rotating, panning and zooming.

Thank you!